

Samuel Oliveira, PhD

JSNN, Department of Nanoengineering
2907 E Gate City Blvd, Rm 209-C
Greensboro, NC, 27401, USA

Visa: US-Green card E-mail: smdoliveira@ncat.edu
Lab website: www.oliveiralab.me Cell: +1 857 310 9593
ResearchID: A-3791-2016 /ORCID: 0000-0002-6914-5529

Primary Goal: Build predictive, microenvironment-enabled platforms for engineering collective biological behavior. The Oliveira Lab integrates microfluidics, live-cell and high-content imaging, automation, and computational modeling to understand how flow, confinement, spatial organization, and cellular communication shape multicellular systems, microbial communities, biofilms, and immune-relevant in vitro models. The lab translates these design principles into programmable biological systems, diagnostics, and reproducible hardware-software-wetware workflows.

PROFESSIONAL EXPERIENCE

- 2023-date Tenure-track Assistant Professor in Nanoengineering**
Department of Nanoengineering - Oliveira Lab - oliveiralab.me
Joint School of Nanoscience & Nanoengineering (JSNN), North Carolina Agricultural & Technical State University, Greensboro, USA
- 2018-date Co-founder in Hardware Automation, Microfluidics, and Biosensors**
Doroth – Biotech Automation for Better Farming – doroth.com.br - Piracicaba, Brazil
- 2024-2025 Scientific Advisor, KBI - kepleybiosystems.com - Greensboro, North Carolina, USA.
Kepley Biosystems - kepleybiosystems.com - Greensboro, North Carolina, USA.
- 2022-2023 Research Assistant Professor - ECE Department- Boston University, Boston, USA
- 2019-2023 Operations Manager - DAMP Lab - damplab.org - Boston University, Boston, USA
- 2019-2022 Postdoctoral Researcher -Densmore Lab - Boston University, USA
- 2014-2018 Researcher -Laboratory of Biosystem Dynamics, Tampere University, Finland

EDUCATION

- 2019 Ph.D. in Biomedical Sciences and Engineering, **Tampere University**, Finland
- 2014 M.Sc. in Bioengineering, **Tampere University**, Finland
- 2012 B.Eng. in Biotechnology, Sao Paulo State University (UNESP), Assis, Brazil

FELLOWSHIPS, AWARDS, AND HONORS

- 2026-2028 NSF REU Site - Multisite REU in Synthetic Biology, co-PI, National Science Foundation, USA.
- 2026-2028 FAPESP PIPE Invest Award, PI, São Paulo Research Foundation, 1.5M BRL, Brazil.
- 2025-2026 North Carolina Collaboratory Research Award, PI, State of North Carolina, \$125,000, USA.
- 2024-2026 DARPA Young Faculty Award, PI, DARPA, \$500,000, USA.
- 2024-2025 NSF/MCB Collaborative Research Award, co-PI, National Science Foundation, \$180,000, USA.
- 2024 NCAT Excellence in Interdisciplinary Research. Best Team Award, Greensboro, USA.
- 2023 The 2nd Best AgriTech Start-up of Brazil Award. DOROTH, AgriShow-2023, Brazil.
- 2022-2024 FAPESP Award, PIPE Invest, Sao Paulo Research Foundation (FAPESP), 1M BRL, Brazil.
- 2021-2023 FINEP Award - Startup Seed, DOROTH, Sao Paulo, Brazil.
- 2019-2021 FAPESP Award, PIPE Phase II, Sao Paulo Research Foundation (FAPESP), 1M BRL, Brazil.
- 2019 Startup Acceleration and Angel Investment Award. DOROTH, SEVNA, Brazil.
- 2019 Best Ph.D. Thesis Award. Supervisor: A.S. Ribeiro, Tampere University, Finland.
- 2018 Ph.D. Grant, Väisälä Fund, Finnish Academy of Science, Tampere, Finland.
- 2014 MSc with distinction, Supervisor: A.S. Ribeiro, Tampere University, Finland.
- 2013 MSc. Thesis Scholarship, DSP, TUT, Tampere, Finland.

SELECTED PUBLICATIONS

 (complete list: <https://scholar.google.com>)

1. K.O. Osiro, N. Hashemi, J. Brango-Vanegas, **S.M.D. Oliveira**, and O.L. Franco (2024) Emerging peptide-based technology for biofilm control. Expert Opinion on Biological Therapy. DOI: 10.1080/14712598.2024.2430623
2. R.Y. Zhou, **S.M.D. Oliveira**, R. Sanka, D. McIntyre, and D. Densmore (2024) Vespa - Rapid Verification for Interactive Microfluidic Device Design. IEEE TCAD. DOI: 10.1109/TCAD.2024.3435706

3. S. Dash, R. Jagadeesan, I.S.C. Baptista, V. Chauhan, V. Kandavalli, **S.M.D. Oliveira**, and A.S. Ribeiro (2024) A library of reporters of the global regulators of gene expression of Escherichia coli. *mSystems*. 9(6). DOI: 10.1128/msystems.00065-24
4. **S.M.D. Oliveira** and D. Densmore (2022) Hardware, Software, Wetware, Co-Design for Synthetic Biology. *BioDesign Research*. 2022(9794510), 15. DOI: 10.34133/2022/9794510
5. B.L.B. Almeida, M.N.M. Bahrudeen, V. Chauhan, S. Dash, V. Kandavalli, A. Häkkinen, J. Lloyd-Price, C.S.D. Palma, I.S.C. Baptista, A. Gupta, J. Kesseli, E. Dufour, O.-P. Smolander, M. Nykter, P. Auvinen, H.T. Jacobs, **S.M.D. Oliveira**, and A.S. Ribeiro (2022) The transcription factor network of E. coli steers global responses to shifts in RNAP concentration. *Nucleic Acids Research*. DOI: 10.1093/nar/gkac540
6. T.S. Jones, **S.M.D. Oliveira**, C.J. Myers, C.A. Voigt, and D. Densmore (2022) Genetic Circuit Design Automation with Cello 2.0. *Nature Protocols*. 17:1097-1113. DOI: 10.1038/s41596-021-00675-2
7. **S.M.D. Oliveira**, A. Häkkinen, J. Lloyd-Price, H. Tran, V. Kandavalli, and A.S. Ribeiro (2017) Temperature-Dependent Model of Multi-Step Transcription Initiation in Escherichia coli Based on Live Single-Cell Measurements. *PLoS Computational Biology*, 12(10):e1005174. DOI: 10.1371/journal.pcbi.1005174

SYNERGISTIC ACTIVITIES

1. Guest Editor/Topic Editor for international journals and reviewer for Nature Communications, Lab on a Chip, ACS Synthetic Biology, IEEE TCAD, NAR Genomics and Bioinformatics, Synthetic Biology Journal, and related venues.
2. Ad hoc reviewer/panelist for NSF GRFP, NSF PCL, UKRI/BBSRC-NSF, SC EPSCoR, FAPESP, and Biohub/CZI programs; contributor to internal JSNN/NCAT research planning and proposal review activities.
3. Mentored 7 current graduate researchers, 3 postdoctoral fellows, 20+ senior research staff/engineers, and 40+ undergraduate and high-school trainees across NCAT, Boston University, Tampere University, and translational programs.
4. Founder/organizer of Python for Bioengineers, Hands-on Microfluidics and Biological Applications, and Computational Biotechnology Hackathon training initiatives; co-founder of DOROTH, an AgTech and bioengineering start-up in Brazil.

TECHNICAL HIGHLIGHTS & EXPERTISE

1. Team Leadership in Microfluidics, Synthetic Biology, and Predictive Bioengineering: Research program vision, proposal development, DARPA/NSF/NC Collaboratory project leadership, interdisciplinary team building, and reporting for high-risk R&D programs.
2. Hardware-Software-Wetware Co-design: Microfluidic chip networks, laboratory automation, high-content/live-cell imaging, AI-enabled analysis pipelines, reproducible data workflows, and automated validation for biological systems.
3. Laboratory and Platform Operations: Academic biofoundry experience, DNA core facility implementation, quality-controlled laboratory workflows, equipment procurement, vendor coordination, biosafety, and scalable operational planning.
4. Expertise in Microfluidics and Automation: CAD tools (Fusion360, Klayout, 3DuF), COMSOL-class transport modeling, Arduino/firmware workflows, LIMS systems, liquid handling robots (Hamilton, OT2-Opentrons), and continuous-flow pumping platforms.
5. Expertise in Live-Cell and Single-Cell Measurement: Epifluorescence, confocal, TIRF, HILO, phase-contrast, DIC, bright-field microscopy, CellASIC ONIX live-cell microfluidics, flow cytometry, and time-lapse image analysis.
6. Expertise in Computational and Systems Biology: Python and MATLAB programming, stochastic simulations, genome-scale/FBA modeling, deep-learning image segmentation, NGS/RNA-seq data analysis, and digital-twin-oriented analysis workflows.
7. Expertise in Molecular, Microbial, and Cell Biology: Genetic engineering, cloning, DNA/RNA extraction and library preparation, transformation and heterologous expression in E. coli, bacterial and microalgae culturing, qPCR, and flow cytometry.